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EXAMINER

CORDRAY, DENNIS R

ART UNIT PAPER NUMBER

1731

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Please find below and/or attached an Office communication concerning this application or proceeding.



## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-6 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 recites that the alkyldiketenes and a polymer comprising vinylamine units is added to "a surface of paper during an engine sizing step." The original Disclosure as filed does not disclose adding a composition to a surface of a paper. Rather, on p 13, lines 33-42, Example 1, the Disclosure states that the sizing dispersions were added to a paper stock, the mixture pH brought to 7.0, and then the mixture was processed on a sheet former. This example is clearly not teaching addition to a surface, but to the paper stock. Claims 2-6 are dependent on Claim 1, thus also carry the limitation of a surface application of the sizing composition.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites that the alkyldiketenes and a polymer comprising vinylamine units is added to "a surface of paper during an engine sizing step." It is not clear how a composition can be applied to the surface of a paper in an engine sizing operation. Engine sizing and surface sizing have very different meanings and are treated as separate terms in the art as evidenced by Kraus et al (6368457) and DeClerq et al (5266165).

Kraus et al teaches that engine sizing, or internal sizing, is a process wherein the fibers are treated during the papermaking operation while surface sizing applies to treating the surface of a formed web (col 1, lines 30-36). Kraus recites examples of internal sizing wherein the sizing composition is mixed with the furnish (cols 3-4, Examples 1 and 2).

DeClerq et al describes surface sizing and engine sizing as separate and distinct processes (col 2, lines 62-65). DeClerq et al teaches that surface sizing comprises application of solutions to a formed web using a size press, by spraying, by immersion or with a ductor (col 3, lines 20-27). In engine sizing, the sizing composition is added to the paper stock, which is then thoroughly mixed and subsequently formed into a sheet (col 3, lines 42-50). With the thorough mixing of a sizing composition into the stock, the formed sheet will contain sizing throughout the paper as well as on the surface.

Claims 2-6 are dependent on Claim 1, thus inherit the indefiniteness thereof.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weisgerber (2961366) or Mitsubishi Paper Mills (JP 08146555 A, English abstract used) in view of Pfohl et al (4774285) or Niessner et al (6159340) and further in view of Auhorn et al (6083348).

Weisgerber discloses a method for internal sizing of paper comprising adding to the pulp an alkyl ketene dimer and polyvinylamine (col 1, lines 33-42, col 3, lines 34-38). Weisgerber discloses a greater degree of sizing is achieved when the amount of polyvinylamine used is from 0.001 to 0.2 percent based on the weight of the pulp (col 3, lines 26-33).

Mistubishi discloses an internal sizing method comprising adding to the pulp an alkyl ketene dimer and mixture of at least two kinds of N-vinylformamide-vinylamine copolymer having different base-hydrolysis ratios, but containing at least 50 mol percent of vinylamine units (at least 50% hydrolyzed). The polymer is added in the amount of at least 0.3 percent based on the weight of the pulp (Abstract).

Weisgerber and Mitsubishi do not disclose the K value of the polymer.

Pfohl et al discloses the addition of a copolymer comprising N-vinylformamide, which has been 30-100 mol percent hydrolyzed to vinylamine, to papermaking stock to

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increase dry and wet strength of the paper formed. The polymer is added in an amount of 0.1 to 5% by weight of the dry fibers (Abstract, col 1, lines 31-46; col 3, lines 4-8).

The copolymers have a Fikentscher K value from 50 to 250, determined at 25 °C in a 5% aqueous sodium chloride solution at a polymer concentration of 0.5% by weight (col 3, lines 37-46; col 3, line 70 to col 4, line 4).

Niessner et al discloses addition of partially hydrolyzed N-vinylformalide polymers to papermaking stock in an amount of 0.01 to 5 percent by weight of the stock, resulting in an increased dry strength. Niessner et al discloses K values from 8 to 300 for the hydrolyzed polymers, determined at 25 °C in 5% aqueous sodium chloride at a polymer concentration of 0.5% by weight (col 5, lines 1-8, 46-49 and 63-67).

Auhorn et al discloses that polymers containing vinylamine units can simultaneously serve in papermaking processes as fixing agents, drainage aids, retention aids as well as wet and dry strength enhancers. Auhorn recites as an example that cationic fixing agents are used for simultaneously purposes of eliminating interfering substances which interfere with the efficiency of retention aids, wet and dry strength agents and engine sizes (col 2, lines 34-48).

The art of Weisgerber, Mitsubishi Paper Mills, Pfohl et al, Niessner et al, Auhorn et al and the instant invention are analogous as pertaining to uses of vinylamine containing polymers used to enhance papermaking processes. It would have been obvious to one of ordinary skill in the art to add vinylamine containing polymers having the claimed K values to the papermaking stock of Weisgerber or Mitsubishi Paper Mills

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in view of Pfohl et al or Niessner et al and further in view of Auhorn et al to enhance the wet and dry strength in addition to improving the sizing of the paper formed.

### ***Response to Arguments***

Applicant's arguments filed 6/29/2006 have been fully considered but they are not persuasive.

Applicant argues on p 5 that Weisgerber reference and the JP-555 references give no indication that the polymers with vinylamine units can act as a promoter for dialkylketenes in a sizing operation. Applicant further argues that the sheet of paper coated with polyolefin resin on both sides is not a candidate for engine sizing.

Weisgerber teaches that incorporation of a polyvinylamine aids in the retention of the ketene dimers, thereby resulting in a greater degree of sizing (promotes the sizing effect) with the same amount of dimer or the same degree of sizing using less dimer (col 1, lines 33-45). JP-555 teaches that the vinyl amine copolymer can fix a neutral sizing agent on the pulp fiber (par 20), thus promoting the sizing effect thereof. The ketene dimer and vinyl amine copolymer are added to the pulp in a sizing operation (par 28) while the polyethylene coating is applied to the formed, dried and calendered paper (par 29).

Applicant argues on pp 5-6 that the Pfohl and Niessner references disclose vinylamine containing polymers as dry and wet strength agents and not used in a sizing treatment. While the polymers of Pfohl et al and Niessner et al are disclosed for use as dry and wet strength agents, the main teaching applicable to the instant invention is that polyvinylamine and poly-N-vinylformamide that is 30-100% hydrolyzed can have the

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claimed K values. The Weisgerber and JP-555 references teach the use of polyvinylamine and poly-N-vinylformamide that is 30-100% hydrolyzed with sizing compositions comprising ketene dimers. The Auhorn reference simply teaches that it is known in the art to add vinylamine containing polymers to a furnish for multiple and simultaneous purposes, such as fixing agents, drainage aids, retention aids, flocculants and strength aids, and that they can promote engine sizes by eliminating substances that interfere with the sizing process (col 2, lines 34-48), thus enhancing the effect of (promoting) the sizing agents. This knowledge is well established in the art and would be known and usable by one of ordinary skill in the art.

Further, Weisgerber et al discloses that the contemplated polyvinylamines have a molecular weight of at least about 10,000 (col 4, lines 14-15). JP-555 recites examples of suitable hydrolyzed poly-N-vinylformamides having from 42 to 98% of vinyl amine units and molecular weights from 58,000 to 160,000 (pars 22-27). The instant Disclosure teaches on p 9, lines 41-46 that such polymers having molecular weights from 1000 to 500,000 correspond to K values from 60 to 90, the claimed range. Thus, it can also be argued that the vinylamine containing polymers of Weisgerber et al and JP-555 inherently possess the claimed K values and the Pfohl, Niessner and Auhorn references are not needed.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP



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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Cordray whose telephone number is 571-272-8244. The examiner can normally be reached on M - F, 7:30 -4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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